**Position:** Research Assistant and/or Master of Engineering (Materials)

**Project Title:** Development of Copper Nanoparticles Paste (NanoCu) as Thermal Interface Material

**Faculty Supervisor:** Professor Gan Chee Lip (MSE)

**Contract:** 1 + 1 year

**Project Synopsis:**

Thermal interface materials (TIMs) are commonly used in microelectronics devices to help dissipate heat from high performance chips to the heat sinks, so as to maintain optimal performance of the devices and improving its reliability. Commonly used TIMs include adhesives, tapes and pastes. Nevertheless, research is always ongoing to identify new TIMs that have better thermal conductivity and have higher working temperatures.

Among the various materials explored, copper nanoparticles is a relatively new material. The usage of NanoCu paste for die attach bonding for high temperature applications has been reported due to its low bonding temperature, high operation temperature, high thermal/electrical conductivity, and lower price when compared to nanoAg material. However, few researches have reported the use of nanoCu as a TIM.

This project aims to investigate the application of NanoCu paste as a TIM, through its process development and characterisation of its properties. The process includes the development of the bonding process of using NanoCu paste, and optimizing the sintering temperature profile in a reflow oven. Characterisation tests include measuring its shear strength, thermal conductivity, modulus, bond-line thickness, and coefficient of thermal expansion (CTE).

**Applicant Qualifications:**

B.Eng. (Materials) graduates with Honours (Distinction) or higher. Applicants should also have interest in the microelectronics industry.

This project is in collaboration with a leading international semiconductor company with opportunity of overseas travel. Project start date is in August 2024 or earlier. For interested applicants, please email your resume to Prof Gan at clgan@ntu.edu.sg.